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not be introduced afterward as the gift of either the nervous system or of the system of presentations.

No wonder, then, that when, in Book III., the same general theory is applied to the profound and difficult problems offered by such a conception as that of the human self, we come almost immediately upon the following statement (p. 475 and note): "We are bound thus to assume that all animals which experience a stream of presentations must have selves not fundamentally dissimilar from human selves." We refuse to recognize any such obligation. And this because we do not find that any semblance of a real self, human or otherwise, can be constructed by any system of presentations, no matter how manifold or skilfully compounded.

The book closes with discussions of the problems of moral responsibility and immortality. This seems to us the most interesting and suggestive part of the entire treatise. But the general theory is carried, in the attempt at a solution of these problems, to its consistent logical result. What appears to the self as free will, even when it culminates in choice, is but the triumph of the stronger over the weaker group of presentations. Character is the general fact that such, rather than other presentations, are accustomed to triumph in the conflict for realization of presentations in the successive fields of consciousness; its basis is laid in an inherited neururgic system. The empirical ego and the self, being a series of presentation compounds, can not, of course, reasonably maintain even the hope of an immortal life. In these important particulars, Mr. Marshall's views resemble more closely the Buddhistic doctrine of *Kharma* than those of western writers generally, when uninfluenced by oriental philosophy.

GEORGE TRUMBULL LADD

SOME NEW CHEMICAL BOOKS

An Elementary Treatise on Qualitative Chemical Analysis. By J. F. SELLERS, Professor of Chemistry, Mercer University, Georgia. Revised edition. Boston, Ginn & Co.

The revised edition of Professor Sellers's

manual is a very good book. The author bases analytic reactions on the dissociation theory, and introduces a number of questions, answers and examples, showing the student in a very helpful way just how this theory explains so many phenomena met in analysis.

A Manual of Qualitative Chemical Analysis.

By J. F. McGREGORY, Professor of Chemistry and Mineralogy in Colgate University. Revised edition. Boston, Ginn & Co.

The revised edition of Professor McGregory's manual is also a good, thorough, well-written book. The author does not think it advisable to introduce the dissociation theory at this stage, and prefers old well-tried methods of separation. Many teachers agree with him.

These two manuals—each excellent—are examples of radically different methods of teaching analysis. A few years ago an occasional book appeared written more or less (generally less) on physical-chemical lines. Now, as a matter of fact the reverse is true. Within the last few years some excellent methods of separation have been devised by Noyes and his co-workers and by others. The conservative manual, rejecting new theories and clinging to the old methods of analysis, is slowly disappearing. The same tendency is even more noticeable in elementary text-books of chemistry; the next three books we have under consideration are text-books, and while each is markedly different from the others all have the common factor of explaining the action of acids on bases and many other phenomena, by the dissociation theory.

Elementary Modern Chemistry. By WILHELM OSTWALD, Emeritus Professor of Chemistry in the University of Leipzig, and HARRY W. MORSE, Instructor in Physics in Harvard University. Boston, Ginn & Co.

Ostwald's little book is probably intended for schools; he touches only the leading facts in chemistry, omitting much that others would retain, while introducing many physical experiments which others would omit. Writers of quite elementary books generally reduce theory to a minimum; Ostwald makes the proportion of theory much greater in this

little book than in his "Grundlinien"; but Ostwald has the power of wording theory so that an intelligent boy not only can understand it, but will be fascinated by it. Hence this is an exceptionally good book for a school, and an ideal foundation for a modern college course. The experiments are simple and require little apparatus. The book is illustrated by excellent diagrams of apparatus and by portraits of leading chemists.

General Inorganic Chemistry. By CHARLES BASKERVILLE, Ph.D., Professor of Chemistry in the College of the City of New York. Boston, D. C. Heath & Co. Pp. 357.

This book differs from most text-books in three important particulars: it is not illustrated, it has scarcely any experiments, its arrangement is quite different from that usually adopted. As to its arrangement, after consideration of hydrogen, oxygen, water, the halogens, the alkali metals, nitrogen and carbon, comes the periodic law; then the elements are considered as such in the order of their grouping in the system; next come the hydrogen compounds of the elements, followed by the halides; chapters on molecular weights and dissociation come next, followed by chapters on the oxides, sulphides, hydroxides and hydrosulphides of the first three groups and part of those of group IV.; then come the carbonates of all the groups; then oxides of silicon, followed by the remaining oxides and sulphides of group IV. Enough of the contents has been given to show the plan of the work. Some teachers may prefer this sequence to that commonly followed. While the book is not large, it is well written, is distinctly original and replete with information.

A Course in Inorganic Chemistry for Colleges. By LYMAN C. NEWELL, Ph.D., Professor of Chemistry, Boston University. Boston, D. C. Heath & Co. 1909. Pp. 594.

This book is intended for the first year in college chemistry. It is well written, thorough, longer than most books of the same grade, but contains nothing too advanced; a part of the excess text is given to theory; electrolytic dissociation, reversible reactions, equilibrium, catalysis, vapor pressure, elec-

trolysis and the behavior of dissolved substances are adequately treated. Still the book is mainly descriptive; descriptions of technical methods and the technical and practical uses of chemical compounds are allotted much more space than is usual. This is good, for a student should familiarize himself with these matters and the first year is the best time to study the outlines of applied chemistry.

Professor Newell's book is illustrated by excellent diagrams and by portraits of great chemists; it ranks among the best college textbooks for the first year.

The Calculations of General Chemistry, with Definitions, Explanations and Problems. By WILLIAM J. HALE, Ph.D., Assistant Professor of Chemistry in the University of Michigan. New York, D. Van Nostrand Co. 1909.

The author intends this book on chemical arithmetic to accompany the first year's laboratory work in general chemistry; he says in the preface:

In the manner of presentation a somewhat different plan has been followed from that usually found in books of this nature. This consists in a gradual introduction of each new condition properly falling under the consideration of some one subject, and the final development of the subject in its entirety from all the conditions thus considered.

The book is doubtless the best yet offered in this field, and should be carefully examined by college teachers.

The Romance of Modern Chemistry. A description in non-technical language of the diverse and wonderful ways in which Chemical Forces are at Work, and of their manifold application in Modern Life. By JAMES C. PHILIP, D.Sc., Ph.D., Assistant Professor of Chemistry, South Kensington College of Technology. London, Seeley & Co.; Philadelphia, J. B. Lippincott Co. 1909.

The cover of this work is multicolored and lurid; the headings in the table of contents suggest those in the daily papers; as—"How Artificial Alizarin has Ousted the Natural Dye from the Market—Natural Indigo Badly Hit—Synthetic *versus* Natural Camphor."

Cover and headings lead one to expect an unbalanced sensational book; this is not the case. The author seems to feel that to make his book interesting to the general reader he must occasionally try to be flippant and sprightly by using slangy colloquialisms. He may be assured that this is not necessary; he has an interesting story to tell and he tells it in a vivid, interesting way. The book is so good that it is a pity it should be marred by these blemishes, and if the author would cut them out in his next edition his book and its readers would be gainers.

The title-page describes the plan of the book; it suggests Lassar-Cohn's famous "Chemistry in Daily Life," which is written on similar lines, but each contains much that the other does not. It is well illustrated and should be welcome to libraries and to the general reader.

EDWARD RENOUF

Exercises in Physical Chemistry. By W. A. ROTH, a. o. Professor of Physical Chemistry in Greifswald; translated by A. T. CAMERON. New York, D. Van Nostrand Co. \$2.00.

This book, embodying, as the author states, the practical course used in Professor Nernst's laboratories, needs no words of praise. Well-chosen experiments are described with full details and due emphasis is laid on consideration of sources of error, methods of calculation, theory of phenomena involved and all that a beginner needs to be told in order to gain the real educational value of the work.

A Text-book of Physical Chemistry; Theory and Practise. By ARTHUR W. EWELL, Assistant Professor of Physics, Worcester Polytechnic Institute. Philadelphia, P. Blakiston's Son & Co. \$2.25.

If this book has a fault, it suffers from "the last infirmity of noble minds," extravagant ambition. Within the scope of 360 pages the author attempts to give "a laboratory manual, a text-book" and a "convenient book of reference." Considering the nature of his task, the author's success is remarkable, though it suggests strongly the breathless haste of the inexperienced tourist trying to "do" all Europe in three months. As a laboratory

manual the directions are hardly full enough; a text-book, in the sense of a book from which the average student could, if necessary, educate himself, it certainly is not; as a work of reference it should prove useful to general students who can not afford to buy larger works. But rather than any of these it resembles those sheets of "lecture notes" which many teachers give their students for purposes of review and as such it is unusually excellent. Statements of fact are almost uniformly correct and theoretical demonstrations, though concise, are adequate, and do not, as in so many similar works, shirk the use of elementary calculus. The author evidently has a thorough grasp of his subject, and, as is shown by a judicious selection of references, a first-hand acquaintance with the literature. But some experience of college and university students causes the reviewer to wonder whether one man in a score could assimilate without mental indigestion, all the contents of this book in less than three or four years of undergraduate study. Expanded to three times the size and properly peptonized it would make one of the best text-books in the English language for post-graduate students specializing in physical chemistry.

B. B. TURNER

The History of the Teaching of Elementary Geometry, with Reference to Present-day Problems. Submitted in partial fulfilment of the requirements for the degree of doctor of philosophy in the Faculty of Philosophy, Columbia University. By ALVA WALKER STAMPER. Pp. x + 163. (Preface dated 1906.)

Comparatively few scholars in the United States are selecting the history of their chosen science as a subject of research. For that reason it is an unusual pleasure to welcome the author of this monograph into the ranks of historians of science. Much has been published on the history of geometry, but the book under review is the first devoted to the history of the *teaching* of elementary geometry. Naturally, one could not trace the history of the teaching of geometry without making frequent references to the history of

the science itself. Especially is this true of the Greek period, in which all data about teaching are closely interwoven with statements relating to geometrical research. Dr. Stamper devotes the first three chapters to the Greeks, Romans and Orientals, one chapter to the Middle Ages, one long chapter to the seventeenth, eighteenth and nineteenth centuries, and two chapters to present-day teaching. The last three chapters contain much that is original with the author. Teachers of geometry will find them suggestive and valuable. Texts have been examined to which no references are usually found in histories. Doubtless it is more difficult to secure data on the teaching than on the progress of a science. In illustration of the difficulty of securing data on teaching we refer to the author's acknowledged inability to fix the time when Euclid began to be used as a text-book in English secondary schools within a closer range than three quarters of a century. Dr. Stamper claims that in England there were no texts on the practical side of geometry, nor any combining the practical with the logical, such as prevailed on the continent up to about the middle of the seventeenth century. We doubt the accuracy of this statement. The present writer has before him books explaining the use of the slide rule by William Oughtred (1660, 1st ed., 1632), Seth Partridge (1662), Hunt (1697), Everard (1705), Leadbetter (1755), which may certainly be classed among works of practical geometry. These books offer fine examples of the correlation of geometry with arithmetic and trigonometry. The title-page of Coggeshall's book refers to the "Use of Scamozzi's Lines, for finding the Lengths and Angles of Hips, Rafters, etc., at any Pitch, in Square, Beveling or Tapering Frames," explained by John Ham, mentioned later in the text as "Master of the Mathematical School at the Chapel in Hatton-Garden, Holborn." The book contains also a regular "compendium of practical geometry." Nor must we forget John Ward's "Young Mathematician's Guide" (1707) where, out of a total of 427 pages, 64 are given to geometry, the subject being

treated in a manner quite remote from Euclid's. In 1771 this text reached its twelfth edition. In the preface we read:

This treatise hath proved a very helpful Guide to near five thousand persons; and perhaps most of them such as would never have looked into mathematicks at all but for it. . . . And not only so, but it hath been very well received amongst the Learned, and (I have often been told) so well approved on at the Universities, in England, Scotland, and Ireland, that it is ordered to be publicly read to their pupils.

In this country Ward's text was used at Harvard College as early as 1737, and as late as 1787 at Yale and Dartmouth.

While the author worked industriously, there are some gaps in his history. For instance, no reference is made to the texts of Basedow and his efforts at reform, nor to the remarkable works of Louis Bertrand. Nor has he used all the available secondary sources of information, such as J. H. Graf's history of mathematics in Bern and L. Isely's history of mathematics in the French part of Switzerland.

The book lacks an alphabetical index, but has a full table of contents and a list of the original and secondary sources used in its preparation. This list will be welcomed by all who may desire to undertake research work on the teaching and history of elementary geometry.

FLORIAN CAJORI

A Treatise on Zoology. Edited by Sir E. RAY LANKESTER. Part I., Introduction and Protozoa. First Fascicle, by S. J. HICKSON, J. J. LISTER, F. W. GAMBLE, A. WILLEY, H. M. WOODCOCK, E. RAY LANKESTER and the late W. F. R. WELDON. Pp. ix-xxii + 296; 151 figs. London, A. & C. Black. 1909.

The present volume, together with the previously published second fascicle dealing with Foraminifera, Sporozoa and Infusoria, completes the account of Protozoa in Lankester's well-known "Treatise on Zoology." The Proteomyxa and Lobosa are described by S. J. Hickson; the Heliozoa by the late W. F. R. Weldon and S. J. Hickson; the Mycetozoa by J. J. Lister; the Radiolaria by F. W.

Gamble; the Mastigophora by A. Willey and S. J. Hickson; the Hæmoflagellates by H. M. Woodcock, while descriptions of Chlamydomyxa and Labyrinthula written by J. J. Lister, form an appendix.

There is little to be said on the whole in regard to the descriptions of the majority of the articles. The section on Hæmoflagellates contains many important facts regarding hosts and parasites, otherwise it differs little from Woodcock's original article in the *Q. J. M. S.*, 1906. It is remarkable, however, that Spirochæta and Treponema are not mentioned in the account of the Mastigophora and that these most widely studied of all protozoan parasites should be passed by with only a short statement in an appendix to the Hæmoflagellates. All of the articles are fairly clear and well-written expositions of the structures and modes of life of the several types of Protozoa, but with the exception of the sections on Mycetozoa and Radiolaria there is little that is new or above the average of an ordinary text-book, while there are few references to literature later than 1906. With the Mycetozoa and the Radiolaria, however, there is no savor of mediocrity. Here the descriptions of structures and life histories are written with reference to the problems in general biology with which the protozoa have the most to do, and with a philosophical breadth of view as refreshing as it is novel.

While the book makes no pretense of arranging the various groups of Protozoa in any way that might be construed as showing phylogenetic relationships of the unicellular animals, it does seem peculiar and unnecessary to separate Heliozoa completely from Radiolaria and insert a section on Mycetozoa between them. As long as the organs of locomotion of Protozoa are accepted as indicating the natural limits of a group, consistency at least should be exercised to keep the undoubtedly close relations of these two groups before the eyes of the student. There is some danger, too, of the latter becoming so tangled up in a maze of unfamiliar terms that he might well wish to get away from the subject as soon as possible and leave the Protozoa

to pedants. He finds that "koniokaryote" protoplasm superseded the condition of "plasson"; that the well-known and well-understood term "cytoplasm" must be replaced by the unfamiliar word "periplasm," and his brain whirls with the confusion of "gubernaculum," "tractellum," "pulsellum," while his ideas of the fixity of biological conceptions get sadly twisted in trying to discover why nature ever made the mistake of allowing a "tractellum" to act as a "pulsellum," or a zoologist to go backwards twenty-five years and classify *Volvox* as a protozoon!

As with all the volumes of this treatise the type, page and illustrations are excellent, the latter being well drawn, clearly reproduced, and many of them unusual as text-book figures. The paper is altogether too thick and clumsy however, making a heavy and poorly bound volume, which will never stand the wear of ordinary use.

G. N. C.

SCIENTIFIC JOURNALS AND ARTICLES

The *Journal of Biological Chemistry*, VI., No. 6, issued November 12, 1909, contains the following: "The Purines and Purine Metabolism of the Human Fetus and Placenta," by H. Gideon Wells and Harry J. Corper. A study showing the independent development of the various purine enzymes during the growth of the fetus and indicating active metabolism in the placenta. "Soluble Chitin from *Limulus polyphemus* and its Peculiar Osmotic Behavior," by C. L. Alsberg and C. A. Hedblom. Prolonged treatment of *Limulus* chitin with HCl produces soluble chitin which has the peculiar power of dialyzing and of carrying the water in which it is dissolved through the membrane. "Some Observations on the Study of the Intestinal Bacteria," by A. I. Kendall. An outline of general procedures applicable to the determination of the more important types of bacterial activity in the intestinal tract. "A Study of the Chemistry of Bacterial Cellular Proteins," by Sybil May Wheeler. A comprehensive study of bacterial proteins from various sources, their properties, the nature and amounts of their cleavage products together with accounts of efforts to